

Claims

- [c1] 1. A catalyst system for use in reducing emissions from an exhaust gas stream comprising:
- a first catalyst for optimizing the storage of NO_x emissions under lean air/fuel ratios, comprising a Perovskite-type ABO₃ crystal structure wherein the A cation sites are occupied by lanthanide ions and the B cation sites are occupied by cobalt ions, wherein from about 1 to up to 70% of the lanthanide A cation sites are substituted with a NO_x trapping metal selected from the group consisting of barium, magnesium, and potassium, wherein from about 1 to up to 60% of the cobalt B cation sites are substituted with a metal selected from the group consisting of platinum, rhodium, iron, copper and manganese; and
- a second catalyst for optimizing the reduction of hydrocarbon, NO_x and CO emissions under stoichiometric air/fuel ratios, comprising a catalyst mixture PM-Rh where PM is a catalyst material selected from the group consisting of platinum, palladium and combinations thereof.
- [c2] 2. The catalyst system of claim 1, wherein the first catalyst is prepared by sol-gel.
- [c3] 3. The catalyst system of claim 1, wherein the first catalyst is prepared by co-precipitation.
- [c4] 4. The catalyst system of claim 1, wherein the ratio of PM to Rh is between 9 and 1.
- [c5] 5. The catalyst system of claim 1, wherein the ratio of PM to Rh is between 7 and 1.
- [c6] 6. The catalyst system of claim 1, wherein the PM has a total loading of 20–60 g/ft³.
- [c7] 7. The catalyst system of claim 1, wherein the PM has a total loading of 40–60 g/ft³.
- [c8] 8. The catalyst system of claim 1, wherein the first catalyst has the formula La_{0.5}Ba_{0.5}Co_{0.9}Rh_{0.1}O₃.

mixture PM–Rh wherein PM is a catalyst material selected from the group consisting of platinum, palladium and combinations thereof.

- [c18] 18. A catalyst system for use in reducing emissions from an exhaust gas stream of a device having an exhaust emitting component, comprising:
a catalyst having a Perovskite-type ABO_3 crystal structure wherein
the A cation sites are occupied by lanthanide ions and the B cation sites are occupied by cobalt ions, wherein from about 1 to up to 70% of the lanthanide A cation sites are substituted with a NOx trapping metal selected from the group consisting of barium, magnesium, and potassium, wherein from about 1 to up to 60% of the cobalt B cation sites are substituted with a metal selected from the group consisting of iron, copper and manganese.
- [c19] 19. The catalyst system of claim 18, wherein the catalyst is coated on a ceramic substrate.
- [c20] 20. The catalyst system of claim 18, wherein the catalyst is coated directly onto the exhaust emitting component.